

What is claimed is:

1. An isolated nucleic acid sequence encoding the polypeptide of SEQ ID NO:2 or SEQ ID NO:4.
- 5 2. An isolated nucleic acid sequence comprising SEQ ID NO:1 or SEQ ID NO:3.
3. A DNA comprising SEQ ID NO:1 or SEQ ID NO:3.
- 10 4. An isolated polypeptide having the sequence of SEQ ID NO:2 or SEQ ID NO:4.
- 15 5. An isolated polypeptide having at least 90% sequence identity to the polypeptide of SEQ ID NO:2 or to the polypeptide of SEQ ID NO:4.
- 20 6. An isolated polypeptide comprising a fragment of at least 200 amino acids of the polypeptide of claim 4.
7. An isolated polypeptide comprising a fragment of at least 200 amino acids of the polypeptide of claim 5.
- 25 8. An isolated nucleic acid encoding a polypeptide as defined in claim 4, 5, 6 or 7.
- 30 9. An expression vector comprising a nucleic acid as defined in claim 8 operably linked to a promoter.
10. A host cell carrying a vector according to claim 9.

11. A nucleic acid primer consisting essentially of a fragment of from 15 to 50 nucleotides of a nucleic acid encoding a polypeptide according to claim 4, 5, 6 or 7.
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12. An assay for an agent capable of binding to a nicotinic acetylcholine receptor, which assay comprises:
- 10 (a) providing a nicotinic acetylcholine receptor comprising at least one polypeptide according to claim 4, 5, 6 or 7;
- (b) contacting said receptor with a putative binding compound; and
- 15 (c) determining whether said compound is able to bind to said receptor.
13. An assay for an agent capable of modulating the activity of a nicotinic acetylcholine receptor, which assay comprises:
- 20 (a) providing a nicotinic acetylcholine receptor comprising at least one polypeptide according to claim 4, 5, 6 or 7;
- (b) contacting said receptor with a putative modulator compound; and
- 25 (c) determining whether said compound is able to modulate the activity of said receptor.
14. An assay according to claim 13, wherein the changes in the ion channel activity of the receptor is
- 30 determined.
15. The assay according to claim 13 which further comprises (a) providing an alpha9 polypeptide, wherein the putative modulator compound is

contacted with said receptor in the presence of the  
alpha9 polypeptide and is contacted with said  
alpha9 polypeptide in the absence of said receptor,  
and (b) determining the ability of the compound to  
5 modulate the activity of said receptor in the  
presence of said alpha9 polypeptide and comparing  
said ability with the ability to modulate the  
activity of said alpha9 polypeptide in the absence  
of said receptor.

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16. The assay according to claim 12, wherein the  
receptor is located in the membrane of a cell  
transformed with a vector, whereby the polypeptide  
is expressed from the vector.

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17. The assay according to claim 12, wherein the assay  
is used to identify a modulator compound for the  
treatment of a condition selected from asthma,  
chronic obstructive lung disease, acute adult  
20 respiratory distress syndrome, sepsis, rheumatoid  
and osteo-arthritis, inflammatory bowel disorder,  
Cröhn's disease and psoriasis, myasthenia gravis,  
schizophrenia, epilepsy, Parkinson's disease,  
Alzheimer's disease, Tourette's syndrome, chronic  
25 pain and nicotine addiction.

18. A novel compound obtained by an assay according to  
claim 12.